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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,609	05/25/2006	Kohachi Tsuji	1207-133	4986
23117 7590 08/11/2010 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
WATTS, ALAN B				
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3656				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/580,609

Applicant(s)

TSUJI ET AL.

Examiner

ALAN B. WAITS

Art Unit

3656

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 12-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 12-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "the taper surface extending in the axial direction so as to be flat or **convex**" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is written in generally narrative form making it unclear which elements/steps are being positively recited and which should be given patentable weight. The examiner suggests rewriting the claims in accordance with 37 CFR 1.75(i) so as to make clear what elements/steps are being positively recited and what should be given patentable weight. As written the claims are unclear and indefinite.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 12-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiuga JP 59-212508 in view of Nakamaru USP 5732322 and in further view of Debnam USP 5927862 and Picone USP 6250815.

Hiuga disclose a similar device comprising:

Re clm 1

- A cylindrical bush bearing (fig 3) whose inner peripheral surface is a sliding surface (3, fig 1)

- An outer peripheral surface of the bush bearing has a cylindrical surface (fig 3)
- A tapered surface (6, fig 1) interposed between the cylindrical surface and at least one annular axial end face (right end, fig 3) of the bush bearing

The limitation:

- formed by press forming

is a product-by-process limitation. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

- A difference $\delta (=r1 - r2)$ between a radius $r1$ of the bush bearing at the cylindrical surface of the bush bearing and a radius $r2$ of the one annular end face at an outer peripheral edge of the one annular end face (fig 1)

Hiuga does not explicitly disclose:

- A difference $\delta (=r1 - r2)$ between a radius $r1$ of the bush bearing at the cylindrical surface of the bush bearing and a radius $r2$ of the one annular end face at an outer peripheral edge of the one annular end face is in a range of not less than $0.1t$ and not more than $0.3t$, where t is a wall thickness of the bush bearing at the cylindrical surface of the bush bearing

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga and provide:

- A difference $\delta (=r1 - r2)$ between a radius $r1$ of the bush bearing at the cylindrical surface of the bush bearing and a radius $r2$ of the one annular

end face at an outer peripheral edge of the one annular end face is in a range of not less than $0.1t$ and not more than $0.3t$, where t is a wall thickness of the bush bearing at the cylindrical surface of the bush bearing since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Hiuga further discloses:

- The tapered surface extends in an axial direction (to the left, fig 3) continuously from the one annular end face
- The cylindrical surface extends continuously in the axial direction from the tapered surface toward another axial end face (left end, fig 3) of the bush bearing
- The bush bearing being constituted by a wrapped bush bearing in which a plate (1, fig 1) having the sliding surface on one surface thereof is convoluted into a cylindrical shape such that the sliding surface is positioned on the inner peripheral side (fig 3)
- A portion of said layer which includes said synthetic resin (3, fig 1) being formed on one surface of the porous sintered metal layer (2, fig 1)
- The wrapped bush bearing is formed by convoluting the multilayered plate into the cylindrical shape such that the sliding layer is positioned on the inner peripheral side (fig 3)

- The tapered surface extending in the axial direction between the cylindrical surface and the one annular end face so as to be flat or convex toward an outside (fig 1)
- An angle of intersection, θ , between the tapered surface and an axial line being not less than 15° and not more than 25° (pg 50, col 1, ln 24)

Hiuga does not disclose

- The plate being constituted by a multilayered plate which includes a back plate entirely coated with copper
- A porous sintered metal layer adhered integrally to a copper coating layer on one surface of the back plate
- A sliding layer including a synthetic resin with which the porous sintered metal layer is impregnated, which has self-lubricity and wear resistance

Nakamaru teaches:

- The plate being constituted by a multilayered plate (fig 1) which includes a back plate (1, fig 1) entirely coated with copper (Col 6, ln 26-30)
- A porous sintered metal layer (col 6, ln 36-37) adhered integrally to a copper coating layer on one surface of the back plate
- A sliding layer including a synthetic resin (3, fig 1) with which the porous sintered metal layer is impregnated, which has self-lubricity and wear resistance

for the purpose of providing a bearing with improved corrosion resistance (col 6, ln 28-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga and provide:

- The plate being constituted by a multilayered plate which includes a back plate entirely coated with copper
- A porous sintered metal layer adhered integrally to a copper coating layer on one surface of the back plate
- A sliding layer including a synthetic resin with which the porous sintered metal layer is impregnated, which has self-lubricity and wear resistance

as taught by Nakamaru, for the purpose of providing a bearing capable of exhibiting a stable low friction coefficient and an extremely low wear amount under dry frictional condition.

Hiuga in view of Nakamaru further disclose:

- The cylindrical surface, the tapered surface and the on annular end face being constituted by an exposed surface of the copper coating layer (fig 3, Hiuga; col 6, ln 27-30, Nakamaru)

Hiuga in view of Nakamaru does not disclose:

- A first smooth circular arc surface being interposed between the tapered surface and the cylindrical surface
- A second smooth circular arc surface being interposed between the tapered surface and the one annular end face

Debnam teaches a bearing (fig 6) and housing (18, fig 4) arrangement comprising rounding corners of a bearing bush (B, fig 6) for the purpose of preventing large shear stress discontinuity caused by sharp corners.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga in view of Nakamaru and provide:

- A first smooth circular arc surface being interposed between the tapered surface and the cylindrical surface
- A second smooth circular arc surface being interposed between the tapered surface and the one annular end face

for the purpose of preventing large shear stress discontinuity caused by sharp corners.

Debnam does not disclose:

- a radius of curvature (of the first smooth arc surface) which is not less than 0.1 mm and not more than 1.0 mm
- a radius of curvature (of the second smooth arc surface) which is not less than 0.1 and not more than 0.5 mm

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga in view of Nakamaru and in further view of Debnam to provide:

- a radius of curvature (of the first smooth arc surface) which is not less than 0.1 mm and not more than 1.0 mm
- a radius of curvature (of the second smooth arc surface) which is not less than 0.1 and not more than 0.5 mm

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Debnam's bearing and housing arrangement further comprises:

- the outer peripheral edge of the annular end face having a smaller diameter than a diameter of a hole of the housing (col 3, ln 20-22, 43)

Hiuga in view of Nakamaru and in further view of Debnam is silent as to the material which is used for the housing and how the bearing is installed into the housing.

As Picone discloses in the background, a bearing and housing arrangement having an aluminum bearing housing (col 1, ln 39) and the bearing is press fitted into the housing (col 1, ln 29-30) is well known in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga in view of Nakamaru and further in view of Debnam to provide:

- an aluminum-made housing in which the bush bearing is press fitted for the purpose of providing a light and strong housing and a way to cheaply fix a bearing into a housing.

Re clm 12 and 21

The limitation:

- the tapered surface is formed by roll forming

is a product-by-process limitation. See above regarding product-by-process limitations.

Re clm 13, Hiuga further discloses

- the peripheral surface of the bush bearing further has, in addition to the tapered surface interposed between the cylindrical surface and the one annular end face, another tapered surface (left side, fig 3) interposed between the cylindrical surface and the other annular axial end face of the bush bearing

Re clm 14, Hiuga further discloses

- the other tapered surface extends in the axial direction continuously from the other annular end face (fig 3)
- the cylindrical surface extends in the axial direction from the other tapered surface toward the one axial end face of the bush bearing (fig 3)

Re clm 15, Hiuga further discloses

- the other tapered surface extends in the axial direction between the cylindrical surface and the other annular end face so as to be flat or convex toward the outside (fig 3)

Re clm 16 and 18, Hiuga does not disclose

- a smooth circular arc surface is interposed between the other tapered surface (one of two tapered ends, fig 3; Hiuga) and the cylindrical surface
- a smooth circular arc surface is interposed between the other tapered surface and the outer annular end face (1, fig 3)

Debnam teaches a bearing (fig 6) and housing (18, fig 4) arrangement comprising rounding corners of a bearing bush (B, fig 6) for the purpose of preventing large shear stress discontinuity caused by sharp corners.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga in view of Nakamaru and provide:

- a smooth circular arc surface is interposed between the other tapered surface and the cylindrical surface
- a smooth circular arc surface is interposed between the other tapered surface and the outer annular end face

for the purpose of preventing large shear stress discontinuity caused by sharp corners.

Re clm 17 and 19

Debnam does not disclose:

- a radius of curvature (of the first smooth arc surface) which is not less than 0.1 mm and not more than 1.0 mm
- a radius of curvature (of the second smooth arc surface) which is not less than 0.1 and not more than 0.5 mm

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hiuga in view of Nakamaru and in further view of Debnam to provide:

- a radius of curvature (of the first smooth arc surface) which is not less than 0.1 mm and not more than 1.0 mm
- a radius of curvature (of the second smooth arc surface) which is not less than 0.1 and not more than 0.5 mm

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re clm 20, Hiuga further discloses

- An angle of intersection, θ , between the other tapered surface and the axial line being not less than 15° and not more than 25° (pg 50, col 1, ln 24)

Re clm 22, Hiuga in view of Nakamaru further discloses:

- The other tapered surface is constituted by an exposed surface of the copper coating layer (fig 3, Hiuga; col 6, ln 27-30, Nakamaru)

Response to Arguments

6. Applicant's arguments with respect to claims 1 and 12-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN B. WAITS whose telephone number is (571)270-3664. The examiner can normally be reached on Monday through Friday 7:30 am to 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan B Waits/
Examiner, Art Unit 3656

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3656